Information and Studies Relevant to Interim California Forest Practices Rules for Watersheds with Threatened or Impaired Values

An Annotated Bibliography

Steve Mader, CH2M HILL, Inc.

Focus of Bibliography

- Forest practices in riparian areas; aquatic habitat and water quality.
- Recent scientific and technical studies, generally since the SRP Report.
- Useful for deciding fate of interim rules.
- Most of the citations are relevant to multiple subsections of the interim rules.
- Not intended to be comprehensive.
- Builds on the *Analysis and Comments for the Proposed Forest Practices Rule Package: Protections for Threatened and Impaired Watersheds* (CH2M HILL, Inc. 2000).

Bibliographical Organization

- Primarily by three categories of watershed processes:
  1. Limitations on the Ecological Influence of Watercourse and Lake Protection Zones
  2. Control of Erosion and Effects of Sediment Delivery
  3. Cumulative Effects Analysis
- Alphabetical, by author, within each of the three categories.

Annotations

- Potentially influential studies are annotated.
- Each contribution contains:
  - Complete bibliographic citation.
  - Statement of the objectives.
  - Summary of significant findings.
  - Conclusion suggesting the relevance of the information to the interim California Forest Practices Rules for Watersheds with Threatened or Impaired Value.
- Additional citations included at the end of the bibliography.

Some Key Results

- CFPRs effectively control sediment delivery to watercourses
  (e.g., Brandow et al. 2006; Cafferata and Munn 2002; Rice 1999).
- Forest erosion is <5% of surface erosion within 200 feet of the stream
  (e.g., Benda 2004).
- WLPZs have physical limits for influencing aquatic habitats, generally 15-100 feet (e.g., Chan et al. 2005; James 2003: Castelle and Johnson 2000).
- Wood recruitment often is dominated by bank erosion sources; 90% of wood volume recruitment is from 26-60 feet of stream
  (e.g., Benda 2003, 2004).

Some Key Results

- Water temperature effects of forest practices are controllable and not cumulative beyond the reach scale (e.g., Lewis et al. 2000; James 2003; Cafferata and Munn 2004).
- Class I WLPZs of 50-100 feet can be thinned without significant reduction of shade, increase in water temperature, or change in near-stream microclimate (e.g., James 2003; James 2004).
- Class II WLPZs: can be thinned without significant reduction of shade or change in water temperature; 16- to 49-foot buffers protect stream microclimate (e.g., Chan et al. 2005).
- Wood delivery of Class II streams to Class I reaches limited to about the lowest 650 feet (e.g., Benda January 2004; Berg et al. 1998; Robison and Runyon 2005).

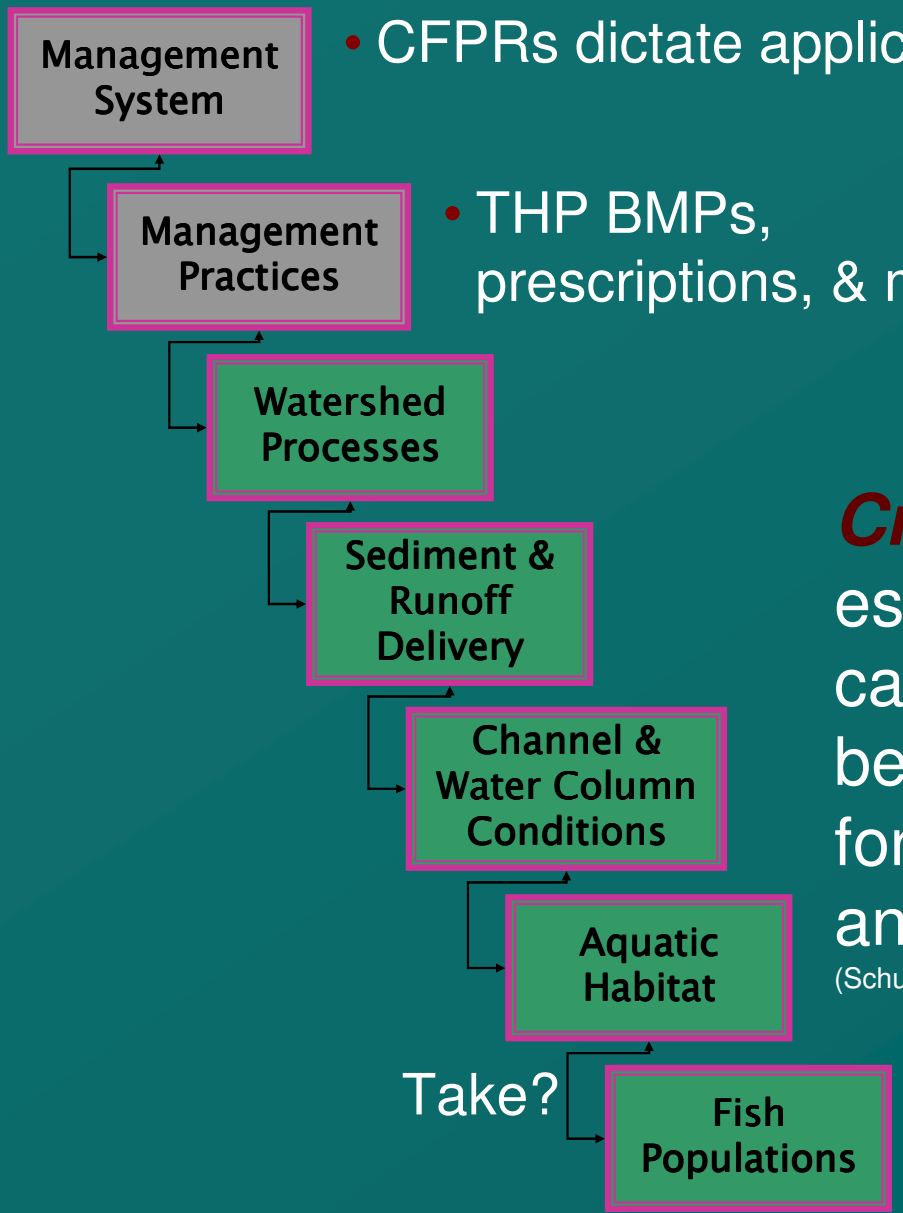
Some Key Results

- Some forest practices rules require expensive technical studies to implement, or cannot be implemented as written in many or most forest watersheds
  (e.g., Wright 2004; Matthews 2003; McBain & Trush 2000; Andras et al. 2005).
- Appropriate data and analytical procedures are lacking or untested for regulating potential cumulative effects of forest practices
  (e.g., MacDonald et al. 2003; Andras et al. 2005).
- Short-term sediment production needs to be placed in the context of long-term background erosion rates
  (e.g., Kirchner 2003; Andras et al. 2005; NCASI 1999).
- Limitations of science need to be taken into account when formulating regulations
  (e.g., Benda et al. 2002).

Potential Utility

Better understandings of:

1. **Baseline water temperatures and sediment delivery conditions of forest watersheds**
2. **Limitations on biophysical effects of forest practices that influence water temperature and sediment delivery**
3. **Ecological risks of potential harm to protected species or violation of water quality standards if a biophysical effect is possible**
4. **Cumulative watershed effects as a forest practices regulatory tool**



- CFPRs dictate applicable rules
- THP BMPs, prescriptions, & mitigation

Critical Pathway Analysis establishes the cause-and-effect linkages between forest practices, water quality, and fish

(Schuett-Hames et al. 1998)

Conclusion

- The compendium of new knowledge fails to support the necessity for the interim California Forest Practices Rules for Watersheds with Threatened or Impaired Values, when compared to the standard rule protections they replaced.